

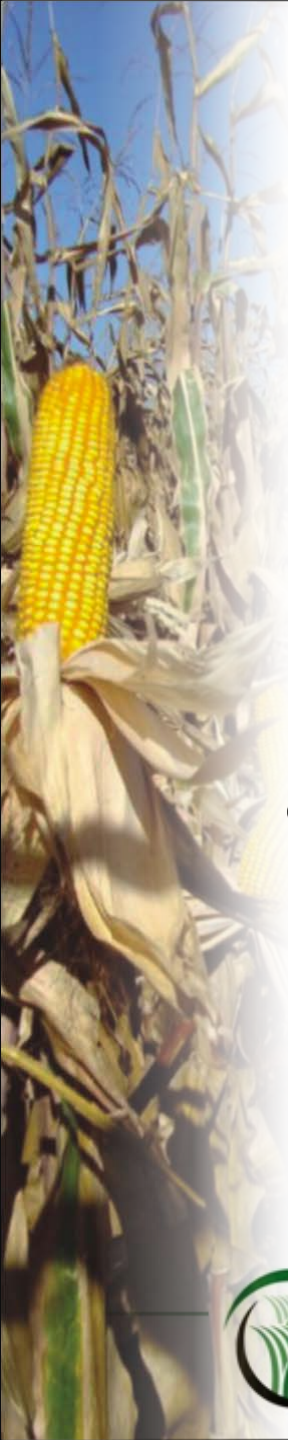
- 2012 LASSC-

**ECOLOGICAL INTENSIFICATION OF MAIZE PRODUCTION
IN THE BRAZILIAN CERRADO**

**L. Prochnow, E. Francisco, V. Casarin, A. Duarte,
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Itiquira, MT



ECOLOGICAL INTENSIFICATION OF MAIZE PRODUCTION IN THE BRAZILIAN CERRADO

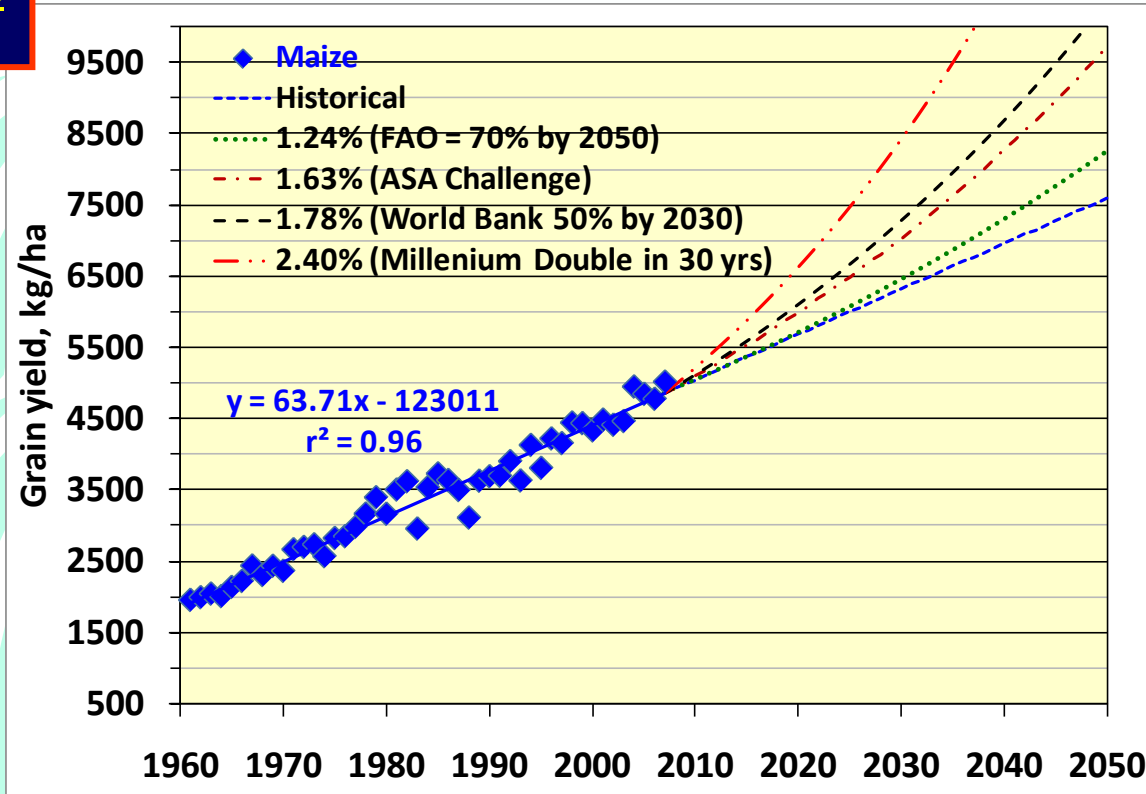
THINGS TO UNDERSTAND:

- ✓ (1) Ecological Intensification (EI)
 - ✓ (2) Brazilian Cerrado
- ✓ (3) IPNI Global Maize Project
 - ✓ (4) Corn 2nd Crop
 - ✓ (5) Brachyaria Grass

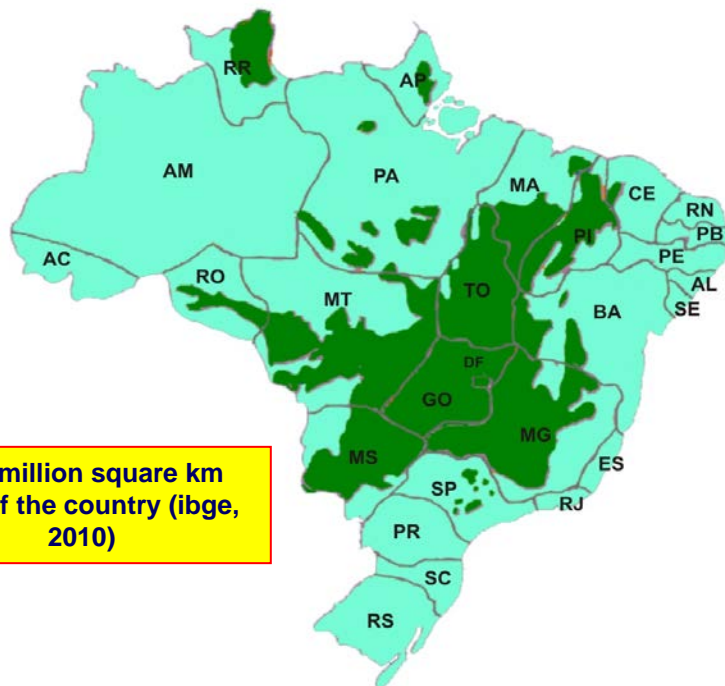
✓ (1) ECOLOGICAL INTENSIFICATION (EI):

EI is a term developed by Cassman (1999) that conceptualizes a production system that satisfies the anticipated increase in food demand while meeting acceptable standards for environmental quality

PROJECTIONS OF WORLD MAIZE YIELDS



✓ (2) BRAZILIAN CERRADO:

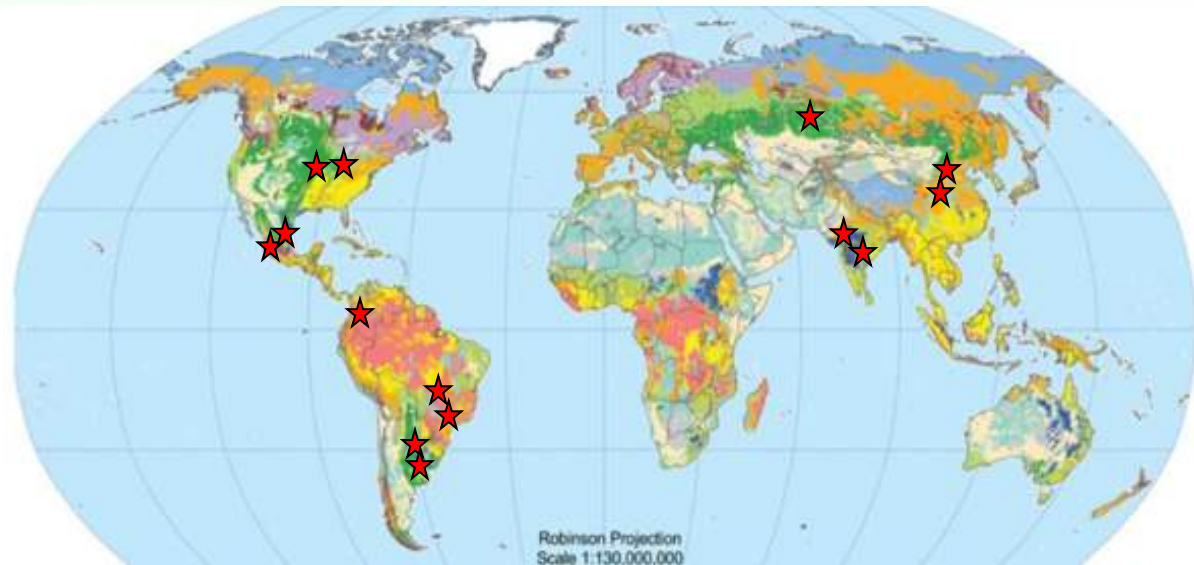


Production still small compared to the potential, which is equivalent to 354 million tons just for the Cerrado.

✓ (3) IPNI GLOBAL MAIZE PROJECT

OVERVIEW

- ✓ Identifies ecological intensification (EI) of maize-based production systems as a high priority and common need.
- ✓ Several experimental sites across regions.



OBJECTIVES

- ✓ Determine the capacity for production increases in various maize growing areas of the world (facilitated by Hybrid Maize Model)
- ✓ Determine what nutrient management practices need to change to close the yield gap faster than the current trend (FP Versus EI)





✓ (4) CORN 2ND CROP



- ✓ Double crop corn following generally soybean. Second crop in the same crop cycling year.
- ✓ For example: Cerrado in Brazil. Soybean from october to march (3.5 t/ha) followed by corn 2nd Crop from march to august (6 t/ha).
- ✓ Corn yield limited by climatic conditions and most especially water stress.

✓ (5) BRACHYARIA GRASS



P RECOVERY FROM SSP OXISOL, 22 YEARS OF DATA

SSP	P RECOVERY	
	Annual Crops	Annual Crops + Brachyaria grass ²
P ₂ O ₅ (kg/ha)	----- % -----	
100	44	85
200	40	82
400	35	70
800	40	62

Source: Sousa et al., 2007.

GMP BRAZIL TEAM MEMBERS

Dr. Gabriel Barth
RF ABC

Dr. Adriel Fonseca
UEPG

Dr. Eros Francisco
IPNI



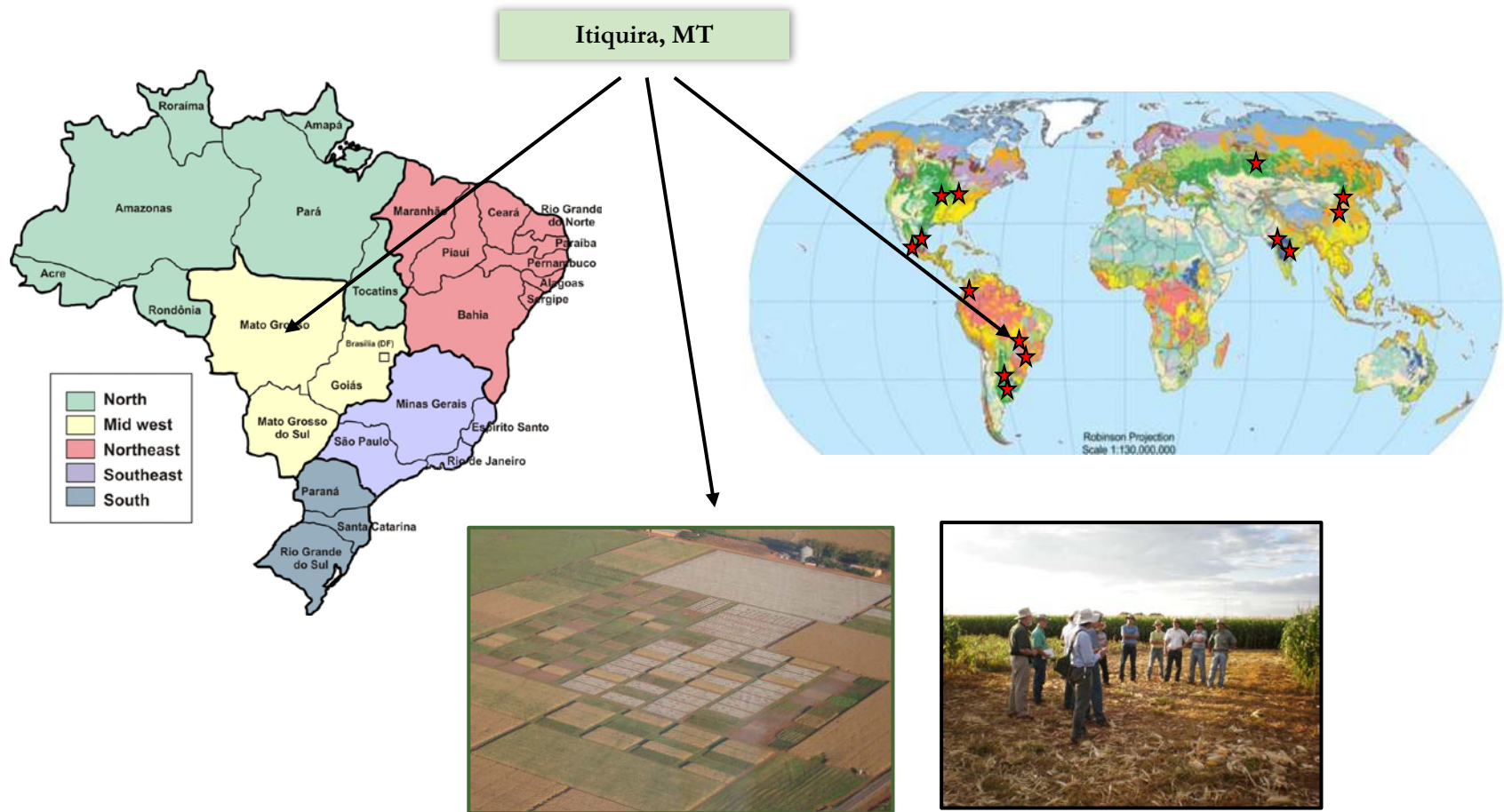
Dr. Luís Prochnow
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Dr. Aildson Duarte
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Dr. Valter Casarin
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GMP BRAZIL

IPNI 18 – Itiquira, MT



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- ✓ Emphasis in corn 2nd crop.
- ✓ Inclusion of corn 1st crop.
- ✓ Regular FP = Soybean – Millet or Soybean -
Corn 2nd Crop.
- ✓ EI = Real cropping system.
- ✓ Inclusion of intermediate treatment which would serve as an intermediate step for farmer going from FP to EI.
- ✓ Split plot design with Cropping system as main plots and N rates as sub plots.
- ✓ Local partner: Research Foundation MT.
- ✓ Experiment started in October 2009.

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EXPERIMENTAL DESIGN

Treat #	Cultivation System	Year			N RATE
		1	2	3	
1.1.	FP	S - M2	S - M2	S - M2	N1
1.2.	FP	S - M2	S - M2	S - M2	N2
1.3.	FP	S - M2	S - M2	S - M2	N3
1.4.	FP	S - M2	S - M2	S - M2	N4
		↓			
2.1.	FP + Cover Crop	S - M2 - B	S - M2 - B	S - M2 - B	N1
2.2.	FP + Cover Crop	S - M2 - B	S - M2 - B	S - M2 - B	N2
2.3.	FP + Cover Crop	S - M2 - B	S - M2 - B	S - M2 - B	N3
2.4.	FP + Cover Crop	S - M2 - B	S - M2 - B	S - M2 - B	N4
		↓	↓	↓	
3A.1.	EI: Maize in Real CR	S - M2 - B	S - C	M1 - B	N1
3A.2.	EI: Maize in Real CR	S - M2 - B	S - C	M1 - B	N2
3A.3.	EI: Maize in Real CR	S - M2 - B	S - C	M1 - B	N3
3A.4.	EI: Maize in Real CR	S - M2 - B	S - C	M1 - B	N4
3B.1.	EI: Maize in Real CR	S - C	M1 - B	S - M2 - B	N1
3B.2.	EI: Maize in Real CR	S - C	M1 - B	S - M2 - B	N2
3B.3.	EI: Maize in Real CR	S - C	M1 - B	S - M2 - B	N3
3B.4.	EI: Maize in Real CR	S - C	M1 - B	S - M2 - B	N4
3C.1.	EI: Maize in Real CR	M1 - B	S - M2 - B	S - C	N1
3C.2.	EI: Maize in Real CR	M1 - B	S - M2 - B	S - C	N2
3C.3.	EI: Maize in Real CR	M1 - B	S - M2 - B	S - C	N3
3C.4.	EI: Maize in Real CR	M1 - B	S - M2 - B	S - C	N4

legend: s- M2 = Soybean – Maize / 2nd crop; S-M2-B = Soybean – Maize / 2nd Crop – Brachiaria / Cover Crop; S-C = Soybean – Crotalaria; M1-B = Maize/1st Crop – Brachiaria; FP = Farmer Practice; CR = Crop Rotation; EI = Ecological Intensification.

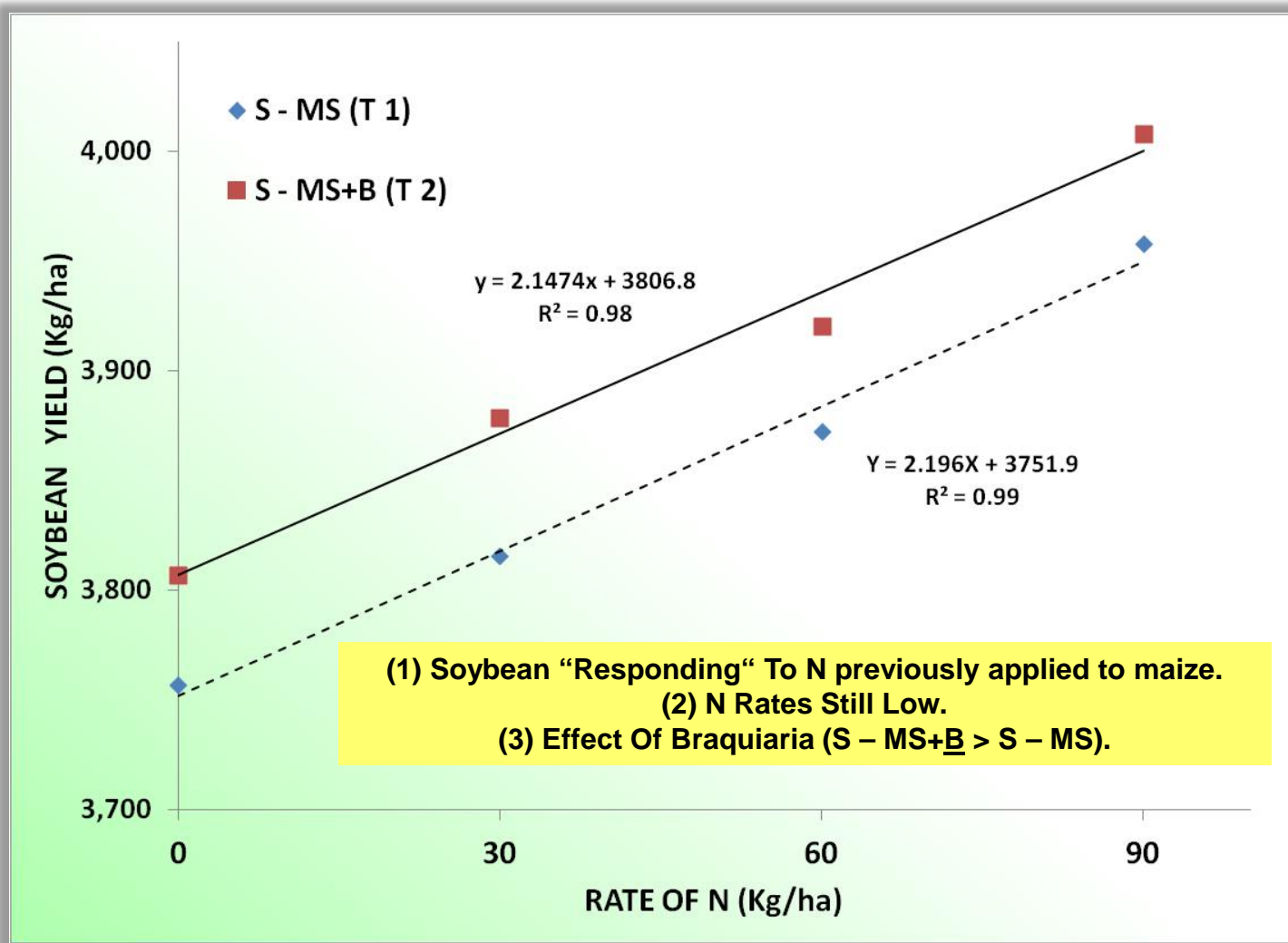


GMP - Itiquira/MT, May 30 2010
Research Foundation MT Agronomic Experimental Station

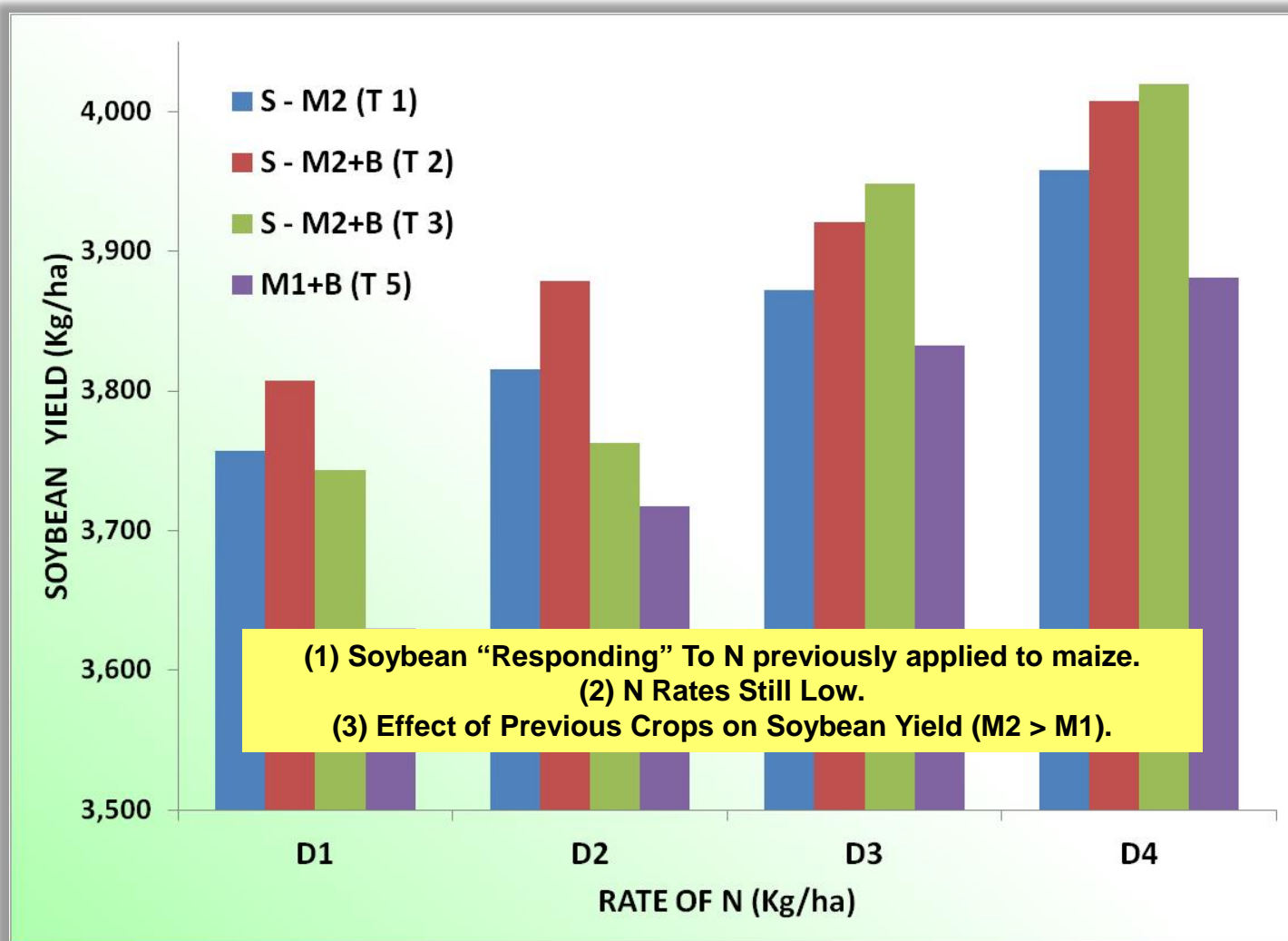




2010/2011



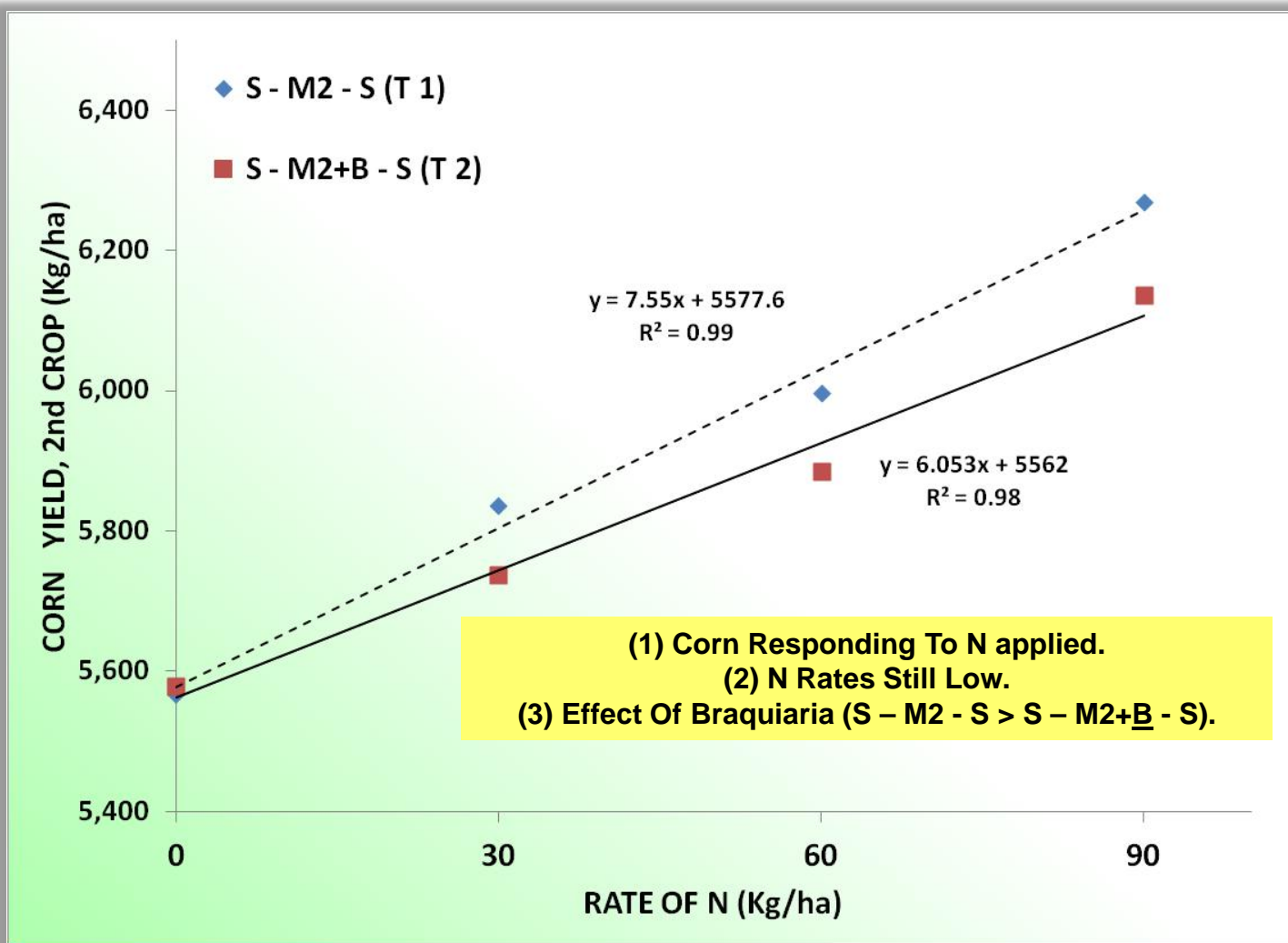
2010/2011



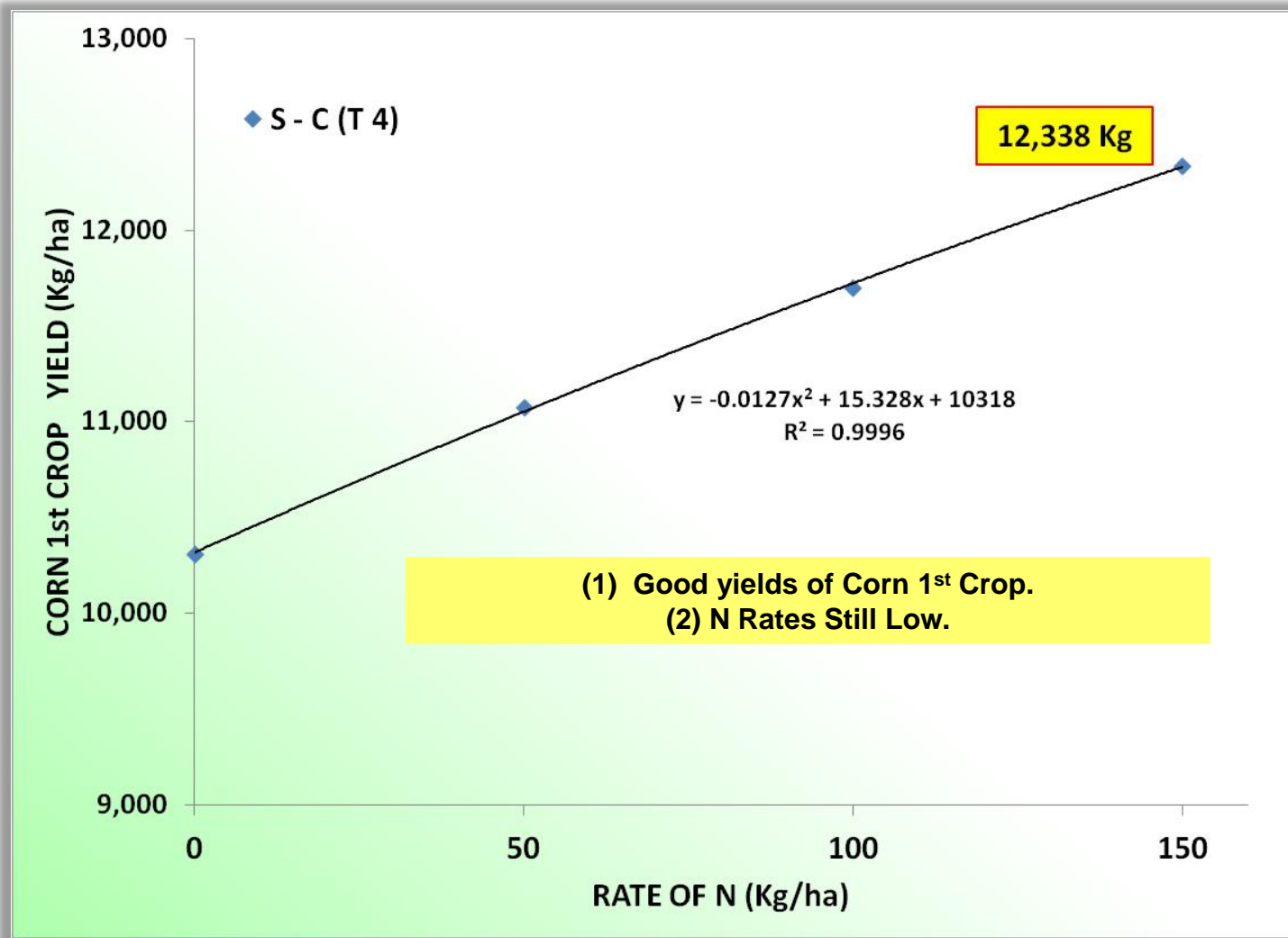
(1) Soybean "Responding" To N previously applied to maize.
(2) N Rates Still Low.
(3) Effect of Previous Crops on Soybean Yield (M2 > M1).

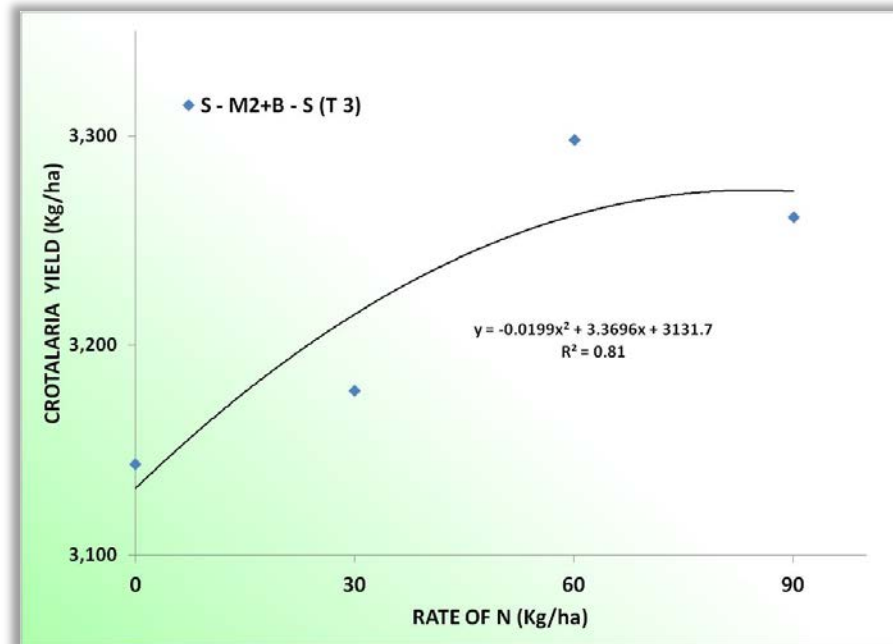
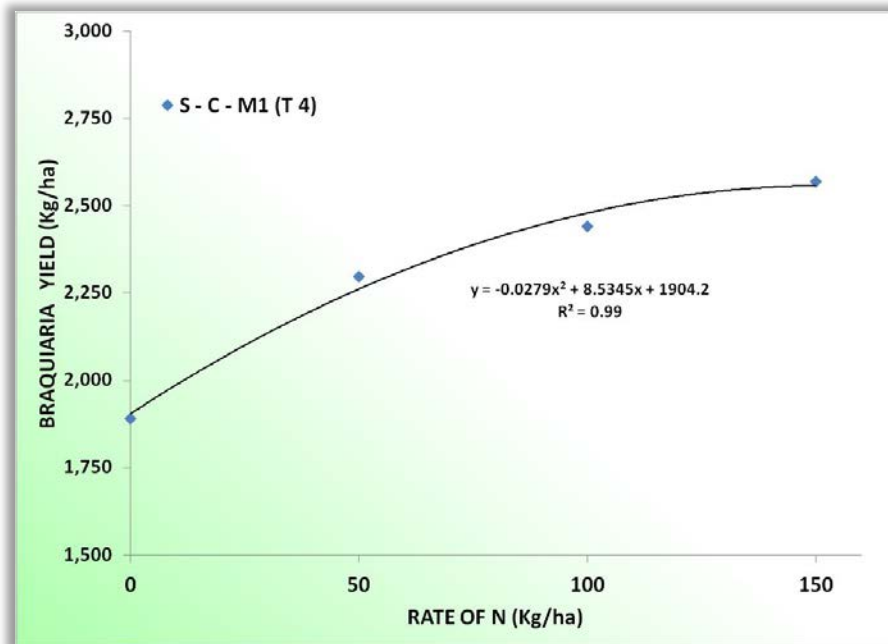


2010/2011



2010/2011

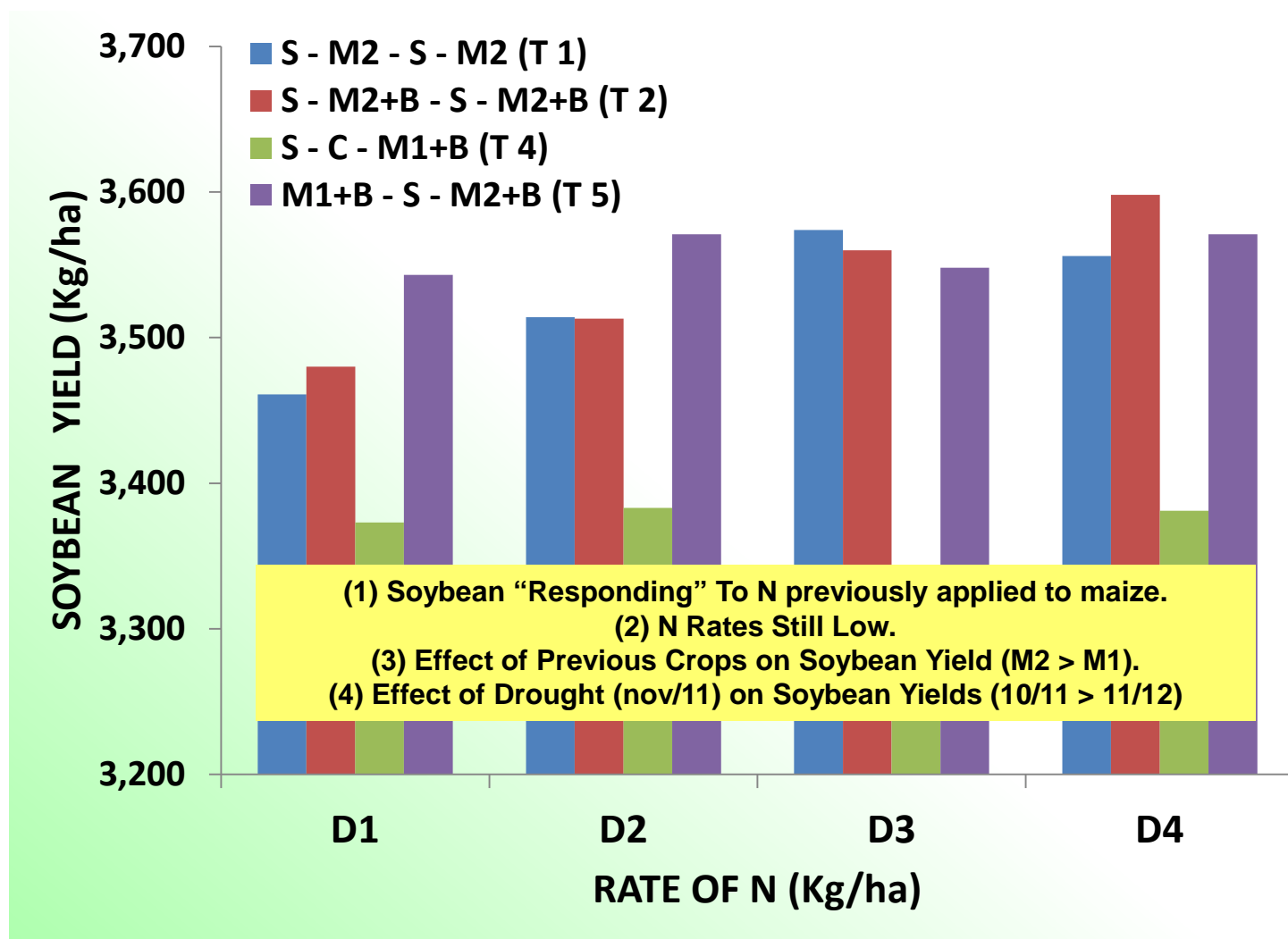




(1) Braquiaria and crotalaria Responding To N Previously applied.



2011/2012



2011/2012

0 N

30

N



Soybean Responding To N previously applied to maize (2# crop)
Picture taken Jan 05th, 2012

60 N

90 N



IPNI INTERNATIONAL PLANT NUTRITION INSTITUTE

Sir Francis Bacon
1561-1626



**Barreiras da mente que interferem na compreensão do mundo natural
(Falácias: caverna, linguagem, teatro, tribo)**

Falácias/Engano do Teatro




**Muitas vezes vemos o que
fomos programados para
ver**



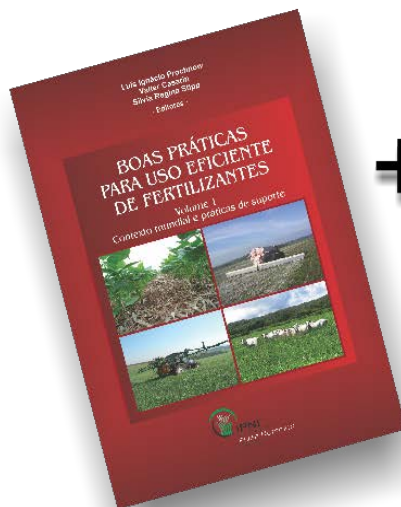
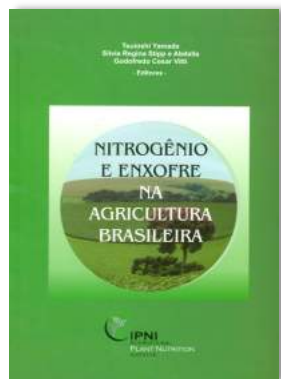
“... Devemos ser abertos a novas propostas/reinvindicações e ouvir as “heresias” científicas que desafiam as nossas mais profundas certezas. Porque se existe algo que é certo na história da ciência, é exatamente que nada é certo na ciência.”

Michael Shermer. 2005. Science Friction

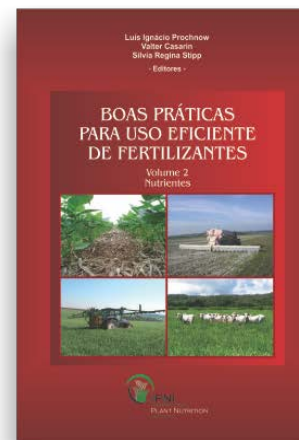
GENERAL COMMENTS

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- ➔
 - ✓ Most data still to be organized and interpreted.
 - ✓ GMP Group in Brazil: Very Excited about future outcomes.
 - ✓ Soon three years of complete crop data.
 - ✓ Difference in yields should increase with time.
 - ✓ The final goal is to transfer technology to farmers in the region as such that in the future there are not much difference between FP and EI.

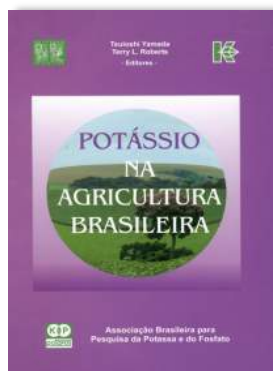
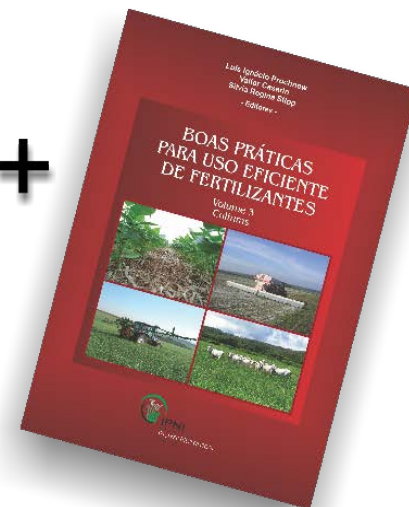
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Soil Fertility and nutrient management



**THANKS WITH WISHES FOR
INCREASE OF CORN YIELDS
WORLDWIDE**



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